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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/036,338	11/09/2001	Robert B. Ford	00030CIP	3312

7590 04/02/2004

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EXAMINER
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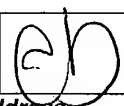
MCDONALD, RODNEY GLENN

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 04/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/036,338	<b>Applicant(s)</b> FORD ET AL.	
	<b>Examiner</b> Rodney G. McDonald	<b>Art Unit</b> 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 41-58 and 60-62 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 41-58 and 60-62 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 41, 46-48 and 60 are rejected under 35 U.S.C. 102(e) as being anticipated by Fu (U.S. Pat. 6,042,706).

Fu teach in Figure 1 ***a sputtering target 10 of a “hollow configuration”*** having an annular region 42 disposed substantially symmetrically about a reference line 40 that is perpendicular to the workpiece 16 and passes through the approximate center of the workpiece 16. ***The annular region 42 comprises the sputtering surface 12 that provides deposition of a film onto the workpiece 16*** that is more uniform than typical films sputtered from circular targets. The preferred annular sputtering surface 12 is a frustoconical surface, most preferably forming an angle alpha from parallel to the workpiece surface 20 to sputter particles having trajectories that are perpendicular to the workpiece surface 20. (Column 5 lines 23-34)

The target 10 also defines a central region 44 disposed substantially symmetrically about the reference line 40. ***The central region 44 comprises an exposed surface 46, 46a that serves to receive direct deposition of particles***

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**sputtered from the annular region that have transverse trajectories.** The exposed surface 46 may be provided by a grounded member, possibly forming a portion of the backing plate 48. Alternatively, an exposed surface 46a may be provided by a sputterable member 11 that extends over the central region 44. Although the surface 46a is potentially sputterable, it is preferred to limit the ionizing enhancing effect of a magnetron 50 to the annular region 42. (Column 5 lines 38-49)

The target 10 produces less particulate contaminants than typical targets, because the central region 44 provides a surface 46, 46a that is disposed to receive direct deposition of sputtered particles. Direct deposition is less likely to flake or fall off a surface than is backscatter deposition which is formed when scattered particles come into contact with a surface. **Furthermore, the surface 46, 46a in the central region is preferably not sputtered in order to avoid disturbing the deposits formed thereon.** (Column 5 lines 50-58)

**The central region comprises a non-sputterable material.** (Column 8 lines 56-56)

**The target has been described in terms of an aluminum target, but the invention may be used in conjunction with other target materials, such as titanium.** (Column 8 lines 15-18)

**The backing plate comprises a material selected from aluminum and stainless steel.** (Column 8 lines 45-47)

The target could have a truncated spherical profile, a bowl shaped profile, or even a non-uniform, curvilinear profile. (Column 6 lines 44-49)

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 41, 46-58 and 60-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fu (U.S. Pat. 6,042,706) in view of Michaluk et al. (WO 00/31310).

Fu is discussed above and all is as applies above. (See Fu discussed above)

The differences between Fu and the present claims is that the grain size being 5 ASTM or finer is not discussed, the target having a mixed (111) -(100) global texture, the uniform grain size is not discussed, the recrystallized features of the target is not discussed, the target being free of localized bands of (100) texture, and the range being from 5 ASTM to 13 ASTM, 5 to 10 ASTM or 7 to 9 ASTM.

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Michaluk et al. teach a tantalum metal that can be utilized as a sputtering target.

(See Abstract)

The tantalum metal can be at least partially recrystallized, and more preferably at least about 98% of the tantalum metal is recrystallized. More preferably the tantalum metal is fully recrystallized. (Page 5 lines 4-7)

The high purity tantalum preferably has a primary or mixed (111) texture, and a minimum (110) texture throughout the thickness of the sputtering target, and is sufficiently void of (100) textural bands. (Page 12 lines 1 1-13)

The tantalum can have grain sizes of ASTM 7.1-7.2, 6.1-6.8, and 5.9-5.9.

Annealing at 1 100 degrees C produced grain sizes of ASTQ 4.0-4.5. (Page 16 lines 25-26 ; Page 17 lines 1-2)

For fully recrystallized tantalum grain sizes of 50 microns or finer is achievable. (Page 17 lines 3-5)

The motivation for selecting the properties of the metal to be within set limits is that it allows for increasing the sputtering efficiency of the targets. (Page 2 lines 4-6)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Fu by selecting the properties of the target metal to be within set limits as taught by Michaluk et al. because it allows for increasing the sputtering efficiency of the targets.

***Allowable Subject Matter***

Claims 42-45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 42-45 are indicated as being allowable over the prior art of record because the prior art of record does not teach a hollow cathode target having a non-sputtering or sputter resistant top portion as claimed where the top portion is made of a valve metal material having a strong (100) texture.

***Response to Arguments***

Applicant's arguments with respect to claims 41-58 and 60-62 have been considered but are moot in view of the new ground(s) of rejection.

Fu is believed to teach "a hollow cathode" in the sense that it has a hollow space in the shaped target. The top portion of the target is sputter resistant since sputtering of the top surface is undesirable. The target can be made of a target material such as aluminum or other known target materials. Michaluk et al. suggest a known target material. What is lacking from these reference is where the top portion is made of a valve metal with a strong (100) texture. The strong (100) texture allows prohibits sputtering from this surface. Fu while suggesting a sputter resistant top portion fail to recognize that the texture should be (100) to prohibit sputtering. There is no direction from Fu to control texture of the metal top portion to prohibit sputtering.

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This action will be made NON-Final based on the newly cited reference.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rodney G. McDonald  
Primary Examiner  
Art Unit 1753

RM  
March 31, 2003